

NORTHWEST of Seattle,

LABORATORIES Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

• SEATTLE, WASHINGTON 98134 •

Telephone: (206) 622-0680

Report to: Alaskan Copper Works

Date: April 14, 1980

Report on: Effluent
P.O. NO. 8955

Lab. No. E 18925

IDENTIFICATION:

Sample #1 Nitric Acid Bath

Sample #2 Oakite Tank Solution

ANALYSIS:

	<u>1</u>	<u>2</u>
Chromium, Cr, PPM	3192	6.1
Nickel, Ni, PPM	2670	5.8
Copper, Cu, PPM	316	19.1

Clyde J. Ambacher
Clyde J. Ambacher

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SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works-Gary Bullard Date: May 14, 1980

Report on: Effluent, P.O. No. 8748 Lab. No. E 19165

IDENTIFICATION:

Sample #1 - 5-2-80, 3 p.m.
Sample #2 - 5-5-80, 3 p.m.
Sample #3 - 5-6-80, 2 p.m.
Sample #4 - Holding Dam #1
5-6-80, 2 p.m.
Sample #5 - Holding Dam #2
5-6-80, 2 p.m.

EFFLUENT
TO METRO
SYSTEM

ROCK PIT

NEUTRALIZING
TANK

SEDIMENT
TANK

ANALYSIS:

	1	2	3	4	5
5.5 PH	9.5	7.8	11.1	11.0	10.2
6 Chromium, Cr, ppm	3.4	2.0	3.1	6.6	477
3 Copper, Cu, ppm	5.7	2.7	4.7	10.3	475
6 Nickel, Ni, ppm	4.8	3.7	3.8	8.1	415
3 Cadmium, Cd, ppm	Less Than 0.1	Less Than 0.1	Less Than 0.1	Less Than 0.1	1.9
3 Lead, Pb, ppm	Less Than 0.1	Less Than 0.1	Less Than 0.1	0.3	15
5 Zinc, Zn, ppm	0.4	0.4	0.3	0.6	1.5

Sam LeBarron

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DATE.	PH	CD	CR	CU	NI	PB	ZN
2/28/80	12.5	.008	8.94	21.85	30.31	1.84	2.45
2/14/80	2.8	.01	45.58	24.04	32.54	.64	1.05
7/16/79	4.4	.08	12.14	6.35	7.86	.36	.53

LIMITS

CONFIDENTIAL REPORT - PUBLICATION RIGHTS RESERVED PENDING WRITTEN AUTHORIZATION

AKC-0015718

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Report to: Alaskan Copper Works-Gary Bullard Date: May 14, 1980

Report on: Effluent, P.O. No. 8748

Lab. No. E 19165

IDENTIFICATION:

Sample #1 - 5-2-80, 3 p.m.
Sample #2 - 5-5-80, 3 p.m.
Sample #3 - 5-6-80, 2 p.m.
Sample #4 - Holding Dam #1
5-6-80, 2 p.m.
Sample #5 - Holding Dam #2
5-6-80, 2 p.m.

ANALYSIS:

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
5.5	PH	9.5	7.8	11.1	11.0	10.2
6	Chromium, Cr, ppm	3.4	2.0	3.1	6.6	477
3	Copper, Cu, ppm	5.7	2.7	4.7	10.3	475
6	Nickel, Ni, ppm	4.8	3.7	3.8	8.1	415
3	Cadmium, Cd, ppm	Less Than 0.1	Less Than 0.1	Less Than 0.1	Less Than 0.1	1.9
3	Lead, Pb, ppm	Less Than 0.1	Less Than 0.1	Less Than 0.1	0.3	15
5	Zinc, Zn, ppm	0.4	0.4	0.3	0.6	1.5

METRO
SEDIMENT
TANK

NEUTRALIZING
TANK

SEDIMENT
HOLDING
TANK

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March 18 1980

CU PPM

21.85

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1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works-Gary Bullard **Date:** June 4, 1980

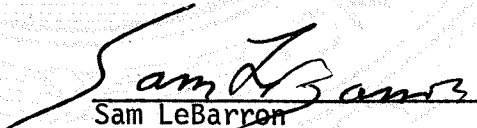
Report on: Effluent, P.O. No. 8904 G-B **Lab. No.** E 19310

IDENTIFICATION:

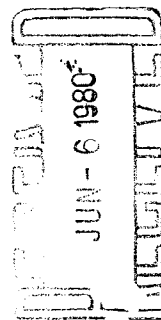
Sample #1 - 5-7-80, 3:30 p.m.
Sample #2 - 5-9-80, 4:00 p.m.
Sample #3 - 5-14-80, 4:00 p.m.
Sample #4 - 5-16-80, 4:00 p.m.
Sample #5 - 5-21-80, 4:00 p.m.
Sample #6 - 5-23-80, 4:00 p.m.

ANALYSIS:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
PH	7.6	9.4	6.7	7.5	8.7	8.0
Chromium, Cr, ppm	4.5	2.8	3.1	2.1	2.0	7.4
Copper, Cu, ppm	5.1	6.4	4.4	3.0	3.6	8.5
Nickel, Ni, ppm	6.4	4.8	4.5	2.6	3.4	7.8
Cadmium, Cd, ppm	Less Than 0.1	Less Than 0.1	Less Than 0.1	Less Than 0.1	Less Than 0.1	Less Than 0.1
Lead, Pb, ppm	0.4	0.5	0.4	0.2	0.1	0.2
Zinc, Zn, ppm	0.5	0.7	0.7	0.1	0.6	0.6


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1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works-Gary Bullard **Date:** June 16, 1980

Report on: Effluent **Lab. No.** E 19407

IDENTIFICATION:

Sample #1 - 5-3-80, 4:30 p.m., silt tank emptied, 11:00 a.m.
Sample #2 - 5-28-80, 4:00 p.m., silt level 6" from top, #2 Dam
Sample #3 - 6-4-80, 4:00 p.m.
Sample #4 - 6-6-80, 3:45 p.m.
Sample #5 - 6-11-80, 3:00 p.m.

ANALYSIS:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Chromium, Cr, ppm	7.6	2.7	5.1	3.0	5.0
Copper, Cu, ppm	8.7	3.4	5.0	4.6	4.6
Nickel, Ni, ppm	8.6	1.9	10.0	4.7	6.8


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JIM BROWN

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1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works
- Gary Bullard
Report on: Effluent - Analysis
P.O. 9178 GB

Date: July 22, 1980

Lab. No. E 19601

IDENTIFICATION: Metro Sump Samples

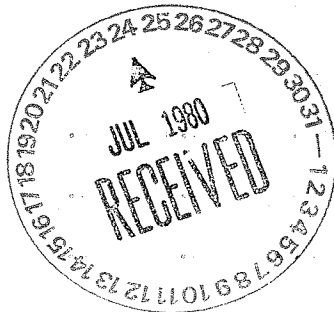
1)	6-13-80	3:30 p.m.	pH 7.5 - Sample taken day after sump was cleaned
2)	6-18-80	4:30 p.m.	pH 10.5
3)	6-20-80	3:30 p.m.	pH 7.5
4)	6-25-80	4:00 p.m.	pH 10
5)	6-27-80	4:00 p.m.	pH 10.5
6)	6-30-80	3:45 p.m.	pH 6 - 1 hour before Alum
7)	7-2-80	9:45 a.m.	pH 11 - 24 hr after Alum
8)	7-3-80	4:00 p.m.	pH 11

<u>ANALYSIS:</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
Chromium, Cr, %	1.4	1.4	5.5	2.1	1.7	71.4	3.2	10.4
Copper, Cu, %	2.5	2.5	6.4	2.9	2.3	52.5	2.7	8.8
Nickel, Ni, %	1.7	2.0	7.1	2.5	1.9	58.2	2.4	8.5


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1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works

Date: 8-28-80

Report on: Effluent

Lab. No. E19854

IDENTIFICATION

Metro Sump Sampler

TEST RESULTS

1- 8-8-80 3p.m., Ph9
2- 8-4-80 3:30p.m., Ph10
Aluminum @ 4 weeks Dam #2
3- 7-2-80 2:30p.m., Ph10.5
Aluminum @ 2 weeks Dam #2

<u>Results</u>	<u>Copper, ppm</u>	<u>Chromium, ppm</u>	<u>Nickel, ppm</u>
Sample			
1	37.7	32.7	50.4
2	9.0	3.2	3.2
3	12.1	4.9	6.5



Albert O. Wahto

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Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works -
Gary Bullard
Report on: Metro Sump Samples - Analysis
P. O. #9833G-B

Date: October 15, 1980

Lab. No. E 20430

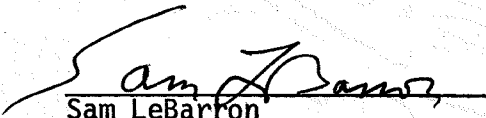
SUBMITTED:

Metro Sump Samples

#1 9-25-80 3:00 p.m. pH 10.5
#2 9-29-80 3:00 p.m. pH 10
#3 10-2-80 11:30 a.m. pH 9
Sample taken 10 min. after Neut. Cycle
#4 10-10-80 1:30 p.m. pH 5

ANALYSIS:

<u>Sample</u>	<u>Chromium, Cr, ppm</u>	<u>Copper, Cu, ppm</u>	<u>Nickel, Ni, %</u>
1	29.3	31.3	44.4
2	1.1	6.0	1.7
3	70.3	85.3	101.8
4	54.9	67.3	82.3


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1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works

Date: October 22, 1980

Report on: Effluent

Lab. No. E 20466

IDENTIFICATION:

Sample #1	10/14/80	#3200
2	10/15/80	3600
3	10/15/80	3200
4	10/16/80	3200
5	10/16/80	3600
6	10/17/80	3600

ANALYSIS:

Sample #	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Lead, Pb, PPM	1.3	0.8	1.2	1.2	0.5	4.0
Cadmium, Cd, PPM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanide, Amenable, PPM	<0.1	<0.1	<0.1	2.5	2.0	<0.1

< = Less Than


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Telephone: (206) 622-0680

Report to: Alaskan Copper Works

Date: October 22, 1980

Report on: Effluent

Lab. No. E 20466

IDENTIFICATION:

Sample #1	10/14/80	#3200
2	10/15/80	3600
3	10/15/80	3200
4	10/16/80	3200
5	10/16/80	3600
6	10/17/80	3600

ANALYSIS:

Sample #	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Lead, Pb, PPM	1.3	0.8	1.2	1.2	0.5	4.0
Cadmium, Cd, PPM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanide, Amenable, PPM	<0.1	<0.1	<0.1	2.5	2.0	<0.1

< = Less Than


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Telephone: (206) 622-0680

Report to: Alaskan Copper Works

Date: November 5, 1980

Report on: Effluent

Lab. No. E 20563

IDENTIFICATION:

Sample #1	Sample received	10/28/80-3200
2	"	10/28/80-3600
3	"	10/29/80-3200
4	"	10/29/80-3600
5	"	10/30/80-3200
6	"	10/30/80-3600

ANALYSIS:

Sample #	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Lead, Pb, PPM	<0.1	<0.1	<0.1	8.6	<0.1	1.0
Cadmium, Cd, PPM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanide, Amenable, PPM	<0.005	<0.005	0.065	0.086	0.031	<0.005

< = Less Than
PPM = Mg/Liter

js

Clyde J. Ambacher
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SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works

Date: November 5, 1980

Report on: Effluent

Lab. No. E 20563

IDENTIFICATION:

Sample #1	Sample received	10/28/80-3200
2	"	" 10/28/80-3600
3	"	" 10/29/80-3200
4	"	" 10/29/80-3600
5	"	" 10/30/80-3200
6	"	" 10/30/80-3600

ANALYSIS:

Sample #	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Lead, Pb, PPM	<0.1	<0.1	<0.1	8.6	<0.1	1.0
Cadmium, Cd, PPM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanide, Amenable, PPM	<0.005	<0.005	0.065	0.086	0.31	<0.005

< = Less Than
PPM = Mg/Liter

js

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1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to: Alaskan Copper Works

Date: November 11, 1980

Report on: Effluent

Lab. No. E20627

Submitted: Three samples of effluent

IDENTIFICATION:

Sample "A" Sediment sample 10-24-80, 3200
Sample "B" Rinse Tank sample 10-24-80, 3200
Sample "C" Acid Vat Sample 10-24-80, 3200

ANALYSIS:

Sample	"A"	"B"	"C"
pH	9.9	1.1	0.9
Acid (as nitric acid), %	---	3.34	12.61

Clyde J. Ambacher
CLYDE J. AMBACHER

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